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Search History

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L21: Entry 14 of 14 File: USPT Dec 26, 1972

DOCUMENT-IDENTIFIER: US 3707298 A
TITLE: SUSPENSION STRUCTURE FOR LAND VEHICLES

Brief Summary Text (1):
This invention relates generally to suspensions for land vehicles and more particularly to a mounting or attachment between the vehicle axle and the components of the suspension which secure the axle in load-bearing relation to the vehicle frame.

Brief Summary Text (2):
This invention represents an improvement over Masser U.S. Pat. No. 2,907,579 wherein a block or pad of elastomer material is inserted between a lateral projection on the axle and a receptacle anchored to a control arm or other component of the suspension secured to the vehicle frame. The elastomer pad yieldably resists rocking of the axle within the receptacle responsive to torsional forces such as brake or drive forces on the axle.

Brief Summary Text (3):
This suspension has enjoyed great commercial success over the years, but it has been found that the elastomer material tends to fail before other components of the suspension. We have discovered that a principal reason for such failure is that the vehicle axle is subjected to torsional forces not only as a result of braking and driving torque but also as a result of diagonal axle walk relative to the vehicle frame which occurs when the wheels at the opposite ends of the axle encounter unlike irregularities in a road or off-the-road surface and conversely when the vehicle frame tilts or rolls relative to the axle. In short, the axle is continually subjected to varying torsional forces during operation, thereby hastening fatigue and failure of the elastomer material.

Drawing Description Text (2):
FIG. 1 is a generally side elevational view of a portion of a vehicle having a suspension which incorporates the present invention, parts being shown in section and in phantom to illustrate structural details.

Detailed Description Text (1):
Shown in FIG. 1 is a vehicle 10 having a body 12 mounted on a frame 14 from which ground-engaging wheels 16 are suspended by a suspension 18 according to the present invention.

Detailed Description Text (2):
Selected for illustration of the invention is a suspension in which an axle 20 which carries wheels 16 is secured in load-bearing relation to frame 14 by a pair of control arms 22 pivotally mounted at 24 on depending frame brackets 26 at opposite sides of the vehicle frame. Axle 20 is secured adjacent its ends to control arms 22 by connections 28 incorporating the present invention. Air springs 30 are disposed in load-bearing relation between control arms 22 and frame 14.

Detailed Description Text (15):
Up to the point where the adaptor and receptacle surfaces make metal-to-metal contact, the suspension is relatively flexible, being dependent primarily upon the spring rate of elastomer body 62. After the initial metal-to-metal contact as at region 82, the

suspension becomes more rigid because of the greater effort required to distort upper elastomer body 66 in a radial direction. Upon the second metal-to-metal contact, as at region 84, the suspension becomes yet more rigid since all flexing thereafter is in the metal components of the suspension.

Detailed Description Text (17):
The relief provided by flat portion 56 of adaptor surface 54 could be provided in other ways such as grooving or other relief contouring either of adaptor surface 54 or receptacle bottom 38. Moreover, while such relief is preferable, it is not in all cases necessary. We have found that it is possible to eliminate such relief and that the suspension will still function satisfactorily.

Detailed Description Text (18):
The clearances shown between surfaces 34, 50 and 36, 52 are somewhat exaggerated for purposes of illustration. While the invention is disclosed with respect to pivoted control arms 22 and the use of air springs 30, connection 28 could be utilized to secure an axle 20 to other suspension components such as a leaf spring stack or a walking beam. Axle connection 28 is equally effective in absorbing torsional forces other than those described above such as brake torque or driving torque, should wheels 16 be mounted on a driven axle. While in the structure illustrated receptacle 32 and adaptor 40 are mounted beneath axle 20, the structure could be inverted so that these components are mounted above axle 20, and the structure would function in the manner described above.

CLAIMS:

1. Suspension structure for a land vehicle which comprises,

an axle adapted to carry ground-engaging wheels,

mounting means mounted on said axle and being adapted to secure said axle in load-bearing relation to a vehicle,

said axle including means providing a first surface which extends transversely of and nonconcentric to the axis of said axle,

said mounting means including means providing a second surface in proximity to but spaced from said first surface,

said axle and mounting means being relatively rockable,

a body of elastomeric material in the space between said surfaces effective to resist said relative rocking,

said first surface having side portions and a central portion closer to said second surface than said side portions,

said material being stressed to a greater extent adjacent said central portion than adjacent said side portions in relative neutral position of said axle and mounting means,

said second surface having a central portion which extends generally parallel to said central portion of said first surface,

one of said central portions being relieved to provide space into which said material can flow upon said relative rocking movement.

5. Suspension structure for a land vehicle which comprises,

an axle adapted to carry ground-engaging wheels,

mounting means mounted on said axle and being adapted to secure said axle in load-bearing relation to a vehicle,

said axle including means providing a first surface which extends transversely of and

nonconcentric to the axis of said axle,

said mounting means including means providing a second surface in proximity to but spaced from said first surface,

said axle and mounting means being relatively rockable,

resilient means in the space between said surfaces effective to resist said relative rocking,

said first surface having side portions and a central portion closer to said second surface than said side portions,

said resilient means being stressed to a greater extent adjacent said central portion than adjacent said side portions in relative neutral position of said axle and mounting means,

said mounting means including means defining a receptacle having sides and having a bottom which forms said second surface,

said axle including means defining a lateral projection having sides which fit with clearance between the receptacle sides and having an end defining said first surface,

said sides having lengths which extend generally parallel to said axis,

each projection side being apposed to one of said receptacle sides,

apposed ones of said sides being interengageable responsive to relative rocking movement of said axle and mounting means about said axis under the influence of force exceeding the resistance of said resilient means.

ohernandez

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Document Listing

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